CLAIMS

1. A disk-shaped rewritable information recording medium having at a first recording layer and a second recording layer, the information recording medium comprising:

a first data area situated in the first recording layer, the first data area having a plurality of addresses allocated thereto, the plural addresses continuously increasing in a first direction;

a second data area situated in the second recording layer, the second data area having a plurality of addresses allocated thereto, the plural addresses continuously increasing in a second direction opposite to the first direction; and

a management information area having an area for recording end recorded area information thereto, the end recorded area information including information for identifying an area in the second data area having data that corresponds to an end position of the second data area.

2. The information recording medium as claimed in claim 1, wherein the management information area further has an area for recording start recorded area information thereto, the start recorded area information including information for identifying an area to which data is continuously recorded

from a start position of a combined data area including the first data area and the second data area.

3. The information recording medium as claimed in claim 1, wherein the management information area further has an area for recording reference recorded area information thereto, the reference recorded area information including information for identifying an area to which data is continuously recorded from a reference position provided in the second data area.

4. A disk-shaped rewritable information recording medium having at least a first recording layer and a second recording layer, the information recording medium comprising:

a first data area situated in the first recording layer, the first data area having a plurality of addresses allocated thereto, the plural addresses continuously increasing in a first direction;

a second data area situated in the second recording layer, the second data area having a plurality of addresses allocated thereto, the plural addresses continuously increasing in a second direction opposite to the first direction; and

a management information area including end recorded area information, the end recorded area information including

information for identifying an area in the second data area having data that corresponds to an end position of the second data area.

5. The information recording medium as claimed in claim 4, wherein the end recorded area information is information related to an end position of an unrecorded area situated at a position in the second data area that is nearest to the end position of the second data area.

6. The information recording medium as claimed in claim 4, wherein the management information area further includes reference recorded area information for identifying an area to which data is continuously recorded from a reference position provided in the second data area.

7. The information recording medium as claimed in claim 4, wherein the first direction is a direction oriented from an inner periphery of the information recording medium to an outer periphery of the information recording medium, wherein the second direction is a direction oriented from the outer periphery of the information recording medium to the inner periphery of the information recording medium.

8. The information recording medium as claimed in

claim 4, wherein the first data area and the second data area have logical addresses continuing from a start position of the first data area to an end position of the second data area.

9. The information recording medium as claimed in claim 4, wherein the management information area further includes start recorded area information for identifying an area to which data is continuously recorded from a start position of a combined data area including the first data area and the second data area.

10. The information recording medium as claimed in claim 9, wherein the start recorded area information is information related to an end position of an area to which data is continuously recorded from the start position of the combined data area.

11. The information recording medium as claimed in claim 9, wherein the start recorded area information includes information indicative of an end position of an area to which data is continuously recorded from a start position of the first data area in the first recording layer, and information indicative of an end position of an area to which data is continuously recorded from a start position of the second data area in the second recording layer.

12. A recording method for recording information to a disk-shaped rewritable information recording medium having at least a first recording layer provided with a first data area having a plurality of addresses allocated thereto and a second recording layer provided with a second data area having a plurality of addresses allocated thereto, the plural addresses of the first data area continuously increasing in a first direction, the plural addresses of the second data area continuously increasing in a second direction opposite to the first direction, the recording method comprising a step of:

recording end recorded area information to the information recording medium for identifying an area in the second data area having data that corresponds to an end position of the second data area.

13. The recording method as claimed in claim 12, further comprising a step of:

recording start recorded area information to the information recording medium for identifying an area to which data is continuously recorded from a start position of a combined data area including the first data area and the second data area.

14. The recording method as claimed in claim 12,

further comprising a step of:

recording reference recorded area information to the information recording medium for identifying an area to which data is continuously recorded from a reference position provided in the second data area.

15. A recording method for recording information to the information recording medium in claim 9, the recording method comprising a step of:

recording data for making the information recording medium compatible with a read only memory information recording medium by referring to the start recorded area information and the end recorded area information recorded to the management information area of the information recording medium.

16. A data structure of information for being recorded to the management information area in the information recording medium in claim 1, the data structure comprising:

end recorded area information including information for identifying an area in the second data area having data that corresponds to an end position of the second data area.

17. An information recording apparatus for recording information to a disk-shaped rewritable information recording

medium having at least a first recording layer provided with a first data area having a plurality of addresses allocated thereto and a second recording layer provided with a second data area having a plurality of addresses allocated thereto, the plural addresses of the first data area continuously increasing in a first direction, the plural addresses of the second data area continuously increasing in a second direction opposite to the first direction, the information recording apparatus comprising:

a recording part for recording data to a designated recording layer among the recording layers of the information recording medium;

a process apparatus for recording end recorded area information to the information recording medium via the recording part, the end recorded area information including information for identifying an area in the second data area having data that corresponds to an end position of the second data area.

18. The information recording apparatus as claimed in claim 17, wherein the end recorded area information is information related to an end position of an unrecorded area situated at a position in the second data area that is nearest to the end position of the second data area.

19. The information recording apparatus as claimed in claim 17, wherein when dummy data is recorded to the second data area, the end recorded area information is updated in correspondence with the area to which the dummy data is recorded.

20. The information recording apparatus as claimed in claim 17, wherein the first data area and the second data area have logical addresses continuing from a start position of the first data area to an end position of the second data area.

21. The information recording apparatus as claimed in claim 17, wherein the process apparatus records start recorded area information to the information recording medium via the recording part, start recorded area information including information for identifying an area to which data is continuously recorded from a start position of a combined data area including the first data area and the second data area.

22. The information recording apparatus as claimed in claim 21, wherein the start recorded area information is information related to an end position of an area to which data is continuously recorded from the start position of the combined data area.

23. The information recording apparatus as claimed 21, wherein the end recorded area information includes information indicative of an end position of an area to which data is continuously recorded from a start position of the first data area in the first recording layer, and information indicative of an end position of an area to which data is continuously recorded from a start position of the second data area in the second recording layer.

24. The information recording apparatus as claimed in claim 21, wherein the process apparatus further records data for making the information recording medium compatible to a read only memory information recording medium via the recording part by referring to the start recorded area information and the end recorded area information recorded to the management information area of the information recording medium.

25. The information recording apparatus as claimed in claim 24, wherein when the area identified by the start recorded area information is entirely included in the first data area, the process apparatus records dummy data, via the recording part, to an unrecorded area situated between a position in the second data area situated at a same radial

position as an end position identified by the start recorded area information and a start position identified by the end recorded area information.

26. The information recording apparatus as claimed in claim 25, wherein the process apparatus records a first intermediate area data to an area following the identified area in the first data area via the recording part and records a second intermediate area data to an area in the second data area situated at a same radial position as the intermediate area in the first data area via the recording part.

27. The information recording apparatus as claimed in claim 24, wherein the process apparatus obtains identification information including information for identifying an area in the second data area to which user data is recorded.

28. The information recording apparatus as claimed in claim 27, wherein the identification information further includes information for identifying an unrecorded area in the first data area.

29. The information recording apparatus as claimed in claim 24, wherein the process apparatus further obtains

identification information including information for identifying an area, following the area identified by the start recorded area information, to which user data is recorded.

30. The information recording apparatus as claimed in claim 27, wherein when user data is recorded in the area identified by the end recorded area information, the process apparatus records dummy data, via the recording part, to an unrecorded area situated between an end position of the area identified by the start recorded area information and a start position of the area identified by the end recorded area information.

31. The information recording apparatus as claimed in claim 21, further comprising a formatting part for formatting the information recording medium, wherein the first and second data areas of the first and second recording layers are divided into a plurality of zones, wherein dummy data is recorded to the plural zones via the recording part and the information recording medium is formatted when there is no request for accessing the information recording medium.

32. The information recording apparatus as claimed in claim 31, wherein the formatting part obtains reference

recorded area information including information for identifying an area to which data is continuously recorded from a reference position, wherein the reference position is a start position of one of the plural zones, wherein the one of the zones includes an end position of an unrecorded area situated adjacent to an area identified by the end recorded area information.

33. The information recording apparatus as claimed in claim 31, wherein the start position of each zone is set as a reference position, wherein area information is set in correspondence with the zones for identifying the area to which data is continuously recorded from the reference position, wherein the formatting part obtains the area information of one of zones as reference recorded area information, wherein the one of the zones includes an end position of an unrecorded area situated adjacent to an area identified by the end recorded area information.

34. The information recording apparatus as claimed in claim 32, wherein in a case of where the formatting part records dummy data to the one of the zones in the second data area, the dummy data is recorded to an unrecorded area situated between an end position of an area identified by the reference recorded area information and a start position of an

area identified by the end recorded area information.

35. The information recording apparatus as claimed in claim 32, wherein the process apparatus further records the reference recorded area information to the information recording medium via the recording part.

36. The information recording apparatus as claimed in claim 31, wherein the first direction of the first data area is a direction oriented from an inner periphery of the information recording medium to an outer periphery of the information recording medium, wherein the second direction of the second data area is a direction oriented from the outer periphery of the information recording medium to the inner periphery of the information recording medium, wherein among the zone including the start position of the unrecorded area adjacent to the area identified by the start recorded area information and the zone including the end position of the unrecorded area adjacent to the area identified by the end recorded area information, the formatting part records dummy data from the zones situated toward the inner periphery of the information recording medium in a case where the end position of the area identified by the start recorded area information belongs to the first data area.

37. A program causing a computer of an information recording apparatus to record information to a disk-shaped rewritable information recording medium having at least a first recording layer provided with a first data area having a plurality of addresses allocated thereto and a second recording layer provided with a second data area having a plurality of addresses allocated thereto, the plural addresses of the first data area continuously increasing in a first direction, the plural addresses of the second data area continuously increasing in a second direction opposite to the first direction, the program comprising:

a recording procedure for recording end recorded area information to the information recording medium, the end recorded area information including information for identifying an area in the second data area having data that corresponds to an end position of the second data area.

38. A computer readable medium comprising:

the program in claim 37.